architecture that will equally facilitate the transmission of wavelength or packet routing network scenarios.

[09]   It is therefore an object of the present invention to provide a local metropolitan switching and routing architecture encompassing a variety of technologies that provides broadband local access distribution.

[10]   It is a further object of the present invention to provide a flexible transport architecture that will facilitate both wavelength-specific and packet-switched routing.

Brief Description of the Preferred Embodiments

[11]   The invention is best described with reference to the detailed description and the following figures, where:

[12]   Fig. 1 depicts several of the known demultiplexing techniques.

[13]   Fig. 2 is a schematic block diagram of an exemplary embodiment of a primary distribution/ aggregation node (with wavelength assignment and cross-connect) for the architecture of the present invention.

[14]   Fig. 3 illustrates a local customer distribution layer embodying a serial array of high-speed optical switches or a matrix of electro-holographic switches, controlled via the local node look-up tables and switch controller circuit, intercepting and switching individual packets out of the wavelength packet stream and directing the packets to the dedicated customer port.

[15]   Fig. 4 is a high level branch-to-node-to-branch schematic showing the primary elements utilized in a node-to-node cross connects via packet (wavelength) assignment and routing within the network mesh configuration.

[16]   Fig. 5a is an exemplary local mesh aggregation and distribution architecture that could embody the node traffic routing flexibility detailed within the present invention .

[17]   Fig. 5b is an exploded view of a single local service domain that would utilize the node-to-node distribution and transport branches detailed in this invention.

[18]   Fig. 5c is another exemplary local service domain embodiment showing increasing migration to the use of FSOC and radio branch-to-node connection-relying less on costly fiber optic deployments

[19]   Fig. 5d is yet another exemplary local service domain where the local service domain is fully accessed and serviced by FSOC and radio branching.

[20]   Fig. 6a depicts a conventional multipath architecture using FSOC in a star and branch configuration with single wavelength branches and minimal link redundancy-. This architecture is one currently employed by FSOC based service applications.

[21]   Fig. 6b is a multi-wavelength branch architecture with dedicated wavelength/node distribution.

[22]   Fig. 6c depicts a multi-wavelength architecture relayed to sequential nodes with localized packet add-drops and a branch distribution.

[23]   Fig. 6d depicts wavelength non-specific branch distribution into the mesh architecture of the present invention with multi-path capability and redundancy of Fig. 6c.

Detailed Description of the Preferred Embodiments

[24]   Metropolitan routing architectures and switching/routing devices that can handle both wavelength and packet-switching will be critical at different layers of the metropolitan networks in the near term. Other complementary technologies such

as local multipoint distribution system (LMDS) radio and free space optical communications (FSOC) will likely be used to reach the customers ahead of fiber, to secure the service revenues and provide broadband connectivity to the customer base. Like fiber-based distribution, a decentralized and layered routing approach, that is locally autonomous, will likely be necessary for these wireless access technologies and future IP-based local network architectures. Local metropolitan routing methodologies will consist of a wirelessly interconnected series of aggregation points capable of routing customer data through the air and or where available, through fiber.

[25]   Metropolitan and access networks of the present invention consist in part of fiber from the core network, dedicated fiber directed to specific buildings or point of presence (POP), and from those deployment locations wireless distribution architectures (both radio and free space optical) to provide a broad range of customer premises access within the service space defined by the service provider. Metropolitan networks of the present invention also employ intelligent aggregation and distributed interconnecting nodes that connect these bi-directional wired and wireless links into a seamless access network that is transparent and compatible with the core network architecture.

[26]   The purpose of the local access nodes will be to aggregate and disseminate bi-directional customer packet- or wavelength-based data within the defined metropolitan service space. Heading up-stream toward the network, the nodes will aggregate multiple customer specific wavelength packet data, inserting and accruing this data into the next aggregation layer packet stream. Heading down-stream from the core network, the distribution nodes will demultiplex wavelengths carrying local customer packets, extracting local customer packets, dropping the local customer packets into the next access distribution layer for local routing. The through-data packet traffic will be passed on and inserted back into the WDM optical link along with locally generated customer data-packet or customer wavelength specific traffic. The down-stream traffic is then directed to